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[Title of the Invention]

PRINT SYSTEM

10

[Abstract]

[Problem to be Solved]

To provide a print system characterized in that a
printer enables a digital camera to photograph with key
15 inputs from an operator panel of the printer, and is
capable of selecting and printing a photographed image
file, or an image file photographed with a digital
camera in the past as well as an image file stored in a
mass storage.

20 [Solution]

This print system allows connection to a device of
a mass storage class, and direct printout of an image
file to a printer by providing the printer with USB
(Universal Serial Bus) interface of a mass storage
25 class.

[Clams for the Patent]

[Claim 1]

A print system, characterized in that a printer
can connect to a device of a mass storage class, and
5 directly print out an image file by providing said
printer with a USB (Universal Serial Bus) interface of
a mass storage class.

[Claim 2]

The print system according to claim 1,
10 characterized by comprising:

said printer,

wherein the USB interface of said printer and a
USB interface of the device are connected with a USB
cable to connect said printer with the device of a mass
15 storage class,

said USB interface of said printer including:

a parallel interface connector;

a USB series B plug connector which connects with
a host computer to transfer data to the host computer
20 in response to a BULK request and an Interrupt request
from the host computer; and

a USB series A plug connector which connects with
the device and operates similarly to the host computer
to issue a request to the device using a BULK request
25 and an Interrupt request,

said printer including:

an operator panel having keys outputting a variety of instructions and an LCD panel displaying contents of the instructions.

[Claim 3]

5 The print system according to claim 2,
characterized by comprising:

 said operator panel of said printer which, in a case that the printer is connected with the device, includes:

10 a CAPTURE key for outputting an instruction to the device;

 an LCD panel for displaying an image file name stored in the device and a status of the device;

 an UP key for scrolling an LCD display upward and
15 a DOWN key scrolling the LCD display downward; and

 a SELECT key used for selecting image files and selecting modes.

[Claim 4]

 The print system according to claim 1,
20 characterized in that the device is a digital camera.

[Claim 5]

 The print system according to claim 1,
characterized in that the device is a removable disk.

[Claim 6]

25 The print system according to claim 1,
characterized in that the device is a hard disk.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to a print system,
5 specifically, to a print system characterized in that a
printer enables a digital camera to photograph with key
inputs from an operator panel of the printer, and is
capable of selecting and printing a photographed image
file, or an image file photographed with a digital
10 camera in the past as well as an image file stored in a
mass storage.

[0002]

[Conventional Art]

Conventionally, as disclosed in Japanese Patent
15 Laid-Open No. 11-252489, when an image photographing
apparatus such as digital camera is directly connected
to a printer to transfer an image, this kind of print
system enables the printer to supply the electric power
to the image photographing apparatus, eliminating a
20 need to connect two AC adaptors to a main electric
power line and simplifying a routing of codes around
the electric power source. While transferring image
data, it reduces the electric power supplied to a
display unit of the image photographing apparatus to
25 avoid a shortage of the electric power capacity.

[0003]

When a digital camera is connected to a printer through a USB (Universal Serial Bus) cable, the digital camera is powered from the printer side to which an AC adaptor is connected through an electric power supply
5 line included in this USB cable.

[0004]

[Problems to be Solved by the Invention]

The first problem of this conventional print system is that a print system of the conventional
10 technology can print out only with an operator operation from a camera.

[0005]

The second problem is that data can not be printed out directly to a printer with the conventional
15 technology when a mass storage device is connected.

[0006]

The purpose of the present invention is to provide a print system characterized in that a printer enables a digital camera to photograph with key inputs from an
20 operator panel of the printer, and is capable of selecting and printing a photographed image file, or an image file photographed with a digital camera in the past as well as an image file stored in a mass storage.

[0007]

25 [Means for Solving the Problems]

A print system of the present invention allows connection to a device of a mass storage class, and

direct printout of an image file to a printer by providing the printer with a USB interface of a mass storage class.

[0008]

5 In addition, the print system of the present invention comprises said printer, wherein a USB interface of said printer and a USB interface of the device are connected with a USB cable to connect said printer with the device of a mass storage class, said
10 USB interface of said printer including: a parallel interface connector; a USB series B plug connector which connects with a host computer to transfer data to the host computer in response to a BULK request and an Interrupt request from the host computer; and a USB
15 series A plug connector which connects with the device and operates similarly to the host computer to issue a request to the device using a BULK request and an Interrupt request, said printer including an operator panel having keys outputting a variety of instructions
20 and an LCD panel displaying contents of the instructions.

[0009]

 Further, when connected with the device, the print system of the present invention includes the operator
25 panel of the printer which includes a CAPTURE key for outputting an instruction to the device, an LCD panel for displaying an image file name stored in the device

and a status of the device, an UP key for scrolling an LCD display upward and a DOWN key for scrolling the LCD display downward, and a SELECT key used for selecting image files and selecting modes.

5 [0010]

Further, the print system of the present invention is characterized in that the device is a digital camera.
[0011]

Further, the print system of the present invention
10 is characterized in that the device is a removable disk.
[0012]

Further, the print system of the present invention is characterized in that the device is a hard disk.
[0013]

15 [Embodiments of the Invention]

A print system of the present invention is characterized to be able to connect to a device of a mass storage class, and directly print out an image file to a printer by providing the printer with a USB
20 interface of a mass storage class.

[0014]

Next, exemplary embodiments of the present invention will be described in detail below referring to the drawings.

25 [0015]

Figure 1 is a connection diagram illustrating an exemplary embodiment of the present invention, Figure 2

is a diagram illustrating an example of an interface of a printer of this exemplary embodiment, and Figure 3 is a diagram illustrating an example of an operator panel of the printer of this exemplary embodiment. A

5 configuration of this exemplary embodiment will be described referring to Figure 1, Figure 2, and Figure 3.

[0016]

A case that a digital camera is used as a device of a mass storage class will be described below.

10 [0017]

A USB interface 12 of a printer 10 and a USB interface 13 of a digital camera 11 are connected with a USB cable 14 to connect the printer 10 and the digital camera 11.

15 [0018]

The USB interface 12 of the printer includes a parallel interface connector 20 of a printer interface which has been conventionally used, a USB series B plug connector 21 which connects with a personal computer
20 serving as a host computer, and transfers data to the host computer in response to a BULK request and an Interrupt request which are requests from the host computer for transmitting or receiving data, and a USB series A plug connector 22 which connects with the
25 digital camera 11 corresponding to a device, executes same operation as that of the host computer to utilize the BULK request and the Interrupt request, and outputs

a request to the device. Further, the printer 10 provides an operator panel 15 including keys 30, 31, 32, and 33 which output a variety of instructions, and an LCD (Liquid Crystal Display) panel 34 which displays contents of the instructions.

[0019]

When connecting to the digital camera 11, the operator panel 15 of the printer 10 includes a CAPTURE key 30 which instructs the digital camera 11 to release the shutter, the LCD panel 34 which displays an image file name stored in the digital camera 11 and a status of the camera, an UP key 31 which scrolls an LCD display upward, a DOWN key 32 which scrolls the LCD display downward, and a SELECT key 33 used for selecting image files and selecting modes.

[0020]

Figure 4 is a flow diagram of a printer operation, Figure 5 is a diagram illustrating a flow of signal between the printer and the digital camera. An operation of this exemplary embodiment will be described referring to Figure 1, Figure 2, Figure 3, and also Figure 4, and Figure 5.

[0021]

It will be described as starting from such a status that the printer 10 and the digital camera 11 are connected, and the printer 10 is in a mode to directly access the digital camera 11.

[0022]

If the digital camera 11 is connected to the USB series A plug connector 22 with the USB cable 14, and it becomes to be in a mode to directly access the
5 digital camera 11, the LCD panel 34 displays a file name as illustrated in Figure 3 (S40).

[0023]

Next, if a key inputting is executed by the CAPTURE key 30 of the operator panel 15 which instructs
10 the digital camera 11 to release the shutter, a Capture Command 50 is transferred to the digital camera 11. The digital camera 11 executes a photograph processing 59 (S41). The printer 10 transfers a Status Command 51 every certain interval.

15 [0024]

While the digital camera 11 is executing an image processing 60, it returns an image processing status 52 to the printer. While processing an image, [Processing] is displayed in the LCD panel 34 (S42).

20 [0025]

While the camera is not executing an image processing 60, an Idle status 54 is returned to the printer 10 with a Status Command 53. If the printer 10 receives the Idle status 54, it determines that the
25 image processing has been executed, and a display of the LCD panel 34 changes to a file name in the digital camera 11 as illustrated in Figure 3 (S43).

[0026]

Next, an operator of the printer selects an image file with scroll keys of the LCD panel 34 display, the UP key 31 and the DOWN key 32, and pushes the SELECT
5 key to transfer a Read Command 55 to the digital camera 11. The Read Command 55 selects cylinder/header/selector/sector/number of sectors of image data (for selecting memory area of a device, there are cylinder, header, and sector in a
10 configuration of a mass storage, for example, cylinder number: 3, header number: 1, and sector number: 4 are set, and a size to be read from a position is set to the number of cylinders to determine the position to be read). If image data selection 62 is completed, the
15 digital camera 11 returns Read command ACK (Acknowledge) 56 to the printer 10 (S44). This processing automatically executes an image data select processing in such a mode that photographed data is quickly printed. Next, the printer 10 outputs Data
20 Request 57 as an image data request for Bulk of USB (for a port transferring data of USB). The digital camera 11 becomes to be in an image data transfer 63 status, and transfers image data 58 to the printer 10. Until transfer of a selected file is completed, it is
25 repeated to return to the Read Command 55 and receive image data. If the received data is an image file, the printer 10 converts an image file to data to be printed

in a format initially selected by the operator panel 15 or the default setting, and prints it out (S45). After that, it can return to S41, and S44 to continue the processing. An operation of another exemplary

5 embodiment will be described by utilizing Figure 1, Figure 2, Figure 3, and also Figure 4, and Figure 5 as starting from such a status that the printer 10 is in a mode to directly access in a connection between the printer 10 and a device (replaced with the digital
10 camera 11 of Figure 1) of a mass storage class of a USB interface. The device denotes a removable disk, a hard disk, etc.

[0027]

A device of a mass storage class is connected to
15 the USB series A plug connector 22 with the USB cable 14, and a file name is displayed in the LCD panel 34 as illustrated in Figure 3. After that, it becomes to be usable from an operation of S44. Next, it will be described from S44.

20 [0028]

If an image file is selected with scroll keys, the UP key 31 and the DOWN key 32, on the operator panel 15 of the printer 10, and the SELECT key 33 is pushed, the Read Command 55 is transferred to a mass storage device.
25 The Read Command 55 selects cylinder/header/selector/sector/number of sectors of data. If the image data selection 62 is completed, the

mass storage device returns the Read Command ACK
(Acknowledge) 56 to the printer 10 (S44).

[0029]

Next, the printer 10 outputs a Data Request 57 as
5 an image data request for a port which executes data
transfer of USB. The mass storage device becomes to be
in an image data transfer 63 status, and transfers
image data 58 to the printer 10. Until the selected
file is completed, it is repeated to return to the Read
10 Command 55 and receive. If the received data is an
image file, the printer 10 converts the image file to
data to be printed in a format initially selected by
the operator panel 15 or the default setting, and
prints it out (S45). After that, it can return to S44
15 to continue the processing.

[0030]

[Advantages of the Invention]

As described above, an advantage of the invention
is that it is possible to easily realize a print system
20 because a printer can directly connect with a digital
camera, output a photographing instruction to cause the
digital camera to release the shutter, select an image
in the digital camera, print out an image file, and
consequently, remotely operate the digital camera.

25 [0031]

In addition, a printer is enabled to print out an
image file of a mass storage device without a personal

computer, because the printer can directly connect with the mass storage device of a USB interface, select a file, and print out an image file.

5 [Brief Description of the Drawings]

[Figure 1]

Figure 1 is a connection diagram illustrating an exemplary embodiment according to the present invention.

[Figure 2]

10 Figure 2 is a diagram illustrating an example of an interface included in a printer of this exemplary embodiment.

[Figure 3]

15 Figure 3 is a diagram illustrating an example of an operator panel included in a printer of this exemplary embodiment.

[Figure 4]

Figure 4 is a flow diagram of a printer operation of this exemplary embodiment.

20 [Figure 5]

Figure 4 is a diagram illustrating a signal flow between the printer and a digital camera of this exemplary embodiment.

25 [Description of Symbols]

10 PRINTER

11 DIGITAL CAMERA

	12	USB INTERFACE
	13	USB INTERFACE
	14	USB CABLE
	15	OPERATOR PANEL
5	20	PARALLEL INTERFACE CONNECTOR
	21	USB SERIES B PLUG CONNECTOR
	22	USB SERIES A PLUG CONNECTOR
	30	CAPTURE KEY
	31	UP KEY
10	32	DOWN KEY
	33	SELECT KEY
	34	LCD PANEL

Figure 1

- 10 PRINTER
- 11 DIGITAL CAMERA
- 12 USB INTERFACE
- 5 13 USB INTERFACE
- 14 USB CABLE
- 15 OPERATOR PANEL

Figure 2

- 10 20 PARALLEL INTERFACE CONNECTOR
- 21 USB SERIES B PLUG CONNECTOR
- 22 USB SERIES A PLUG CONNECTOR

Figure 3

- 15 15 OPERATOR PANEL
- 30 CAPTURE KEY
- 31 UP KEY
- 32 DOWN KEY
- 33 SELECT KEY
- 20 34 LCD PANEL

Figure 4

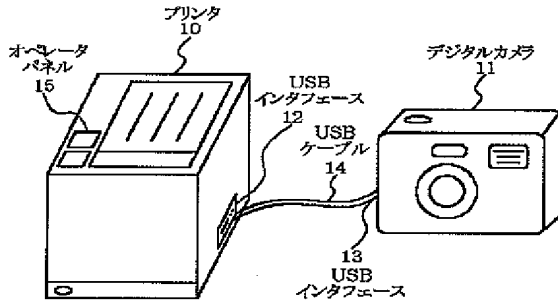
- S40 DISPLAY FILE NAME IN CAMERA ON LCD PANEL BY
CONNECTING TO USB CONNECTOR
- 25 S41 OUTPUT PHOTOGRAPHING REQUEST TO CAMERA WITH
CAPTURE KEY OF OPERATOR PANEL

- S42 DISPLAY [PROCESSING] ON LCD PANEL WHILE IMAGE
PROCESSING
- S43 LCD PANEL DISPLAY CHANGES TO FILE DISPLAY AFTER
IMAGE PROCESSING IS COMPLETED
- 5 S44 SELECT IMAGE WITH DOWN OR UP KEY OF OPERATOR PANEL
- S45 PRINT OUT SELECTED IMAGE

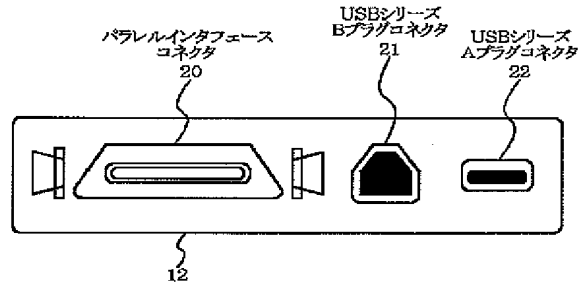
Figure 5

- 52 IMAGE PROCESSING STATUS
- 10 58 IMAGE DATA
- 59 PHOTOGRAPHING
- 60 IMAGE PROCESSING
- 61 IDLE STATUS
- 62 DATA SELECTION
- 15 63 IMAGE DATA TRANSFER
- #1 CAPTURE REQUEST
- #2 CAMERA STATUS CONFIRMATION
- #3 IMAGE PROCESSING STATUS RECEIVING
- #4 CAMERA STATUS CONFIRMATION
- 20 #5 IDLE STATUS RECEIVING (CONFIRM IMAGE PROCESSING
COMPLETION)
- #6 IMAGE SELECTION REQUEST
- #7 IMAGE SELECTION CONFIRMATION
- #8 IMAGE DATA REQUEST
- 25 #9 IMAGE DATA RECEIVING
- #10 RETURN TO IMAGE SELECTION REQUEST UNTIL ONE FILE
IS COMPLETED

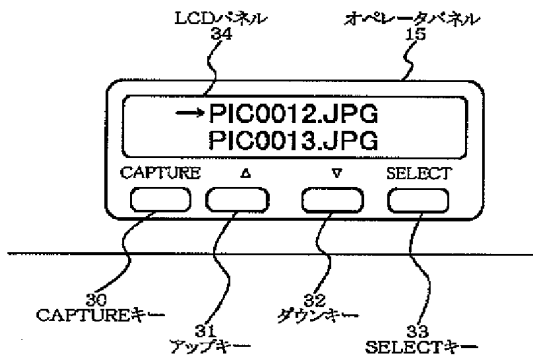
【図1】 FIG. 1



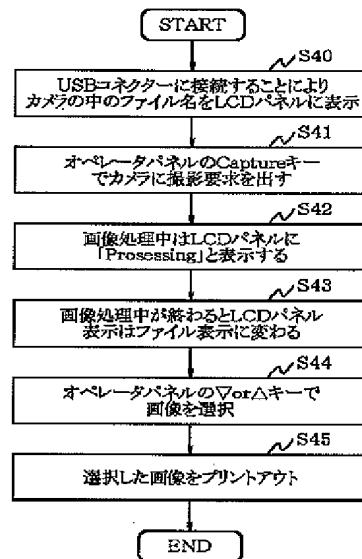
【図2】 FIG. 2



【図3】 FIG. 3



【図4】 FIG. 4



【図5】 FIG. 5

